

[Method and Apparatus for Reducing Pressure in a Perforating Gun]

Abstract

An apparatus for reducing the post-detonation pressure of a perforating gun, the apparatus including a perforating gun carrying at least one explosive charge, wherein when the explosive charge is detonated the explosive charge produces a pressurized detonation gas, and a mechanism for reducing the pressure of the detonation gas proximate the perforating gun. The detonation gas pressure is desirably reduced in a time frame sufficient to create a dynamic underbalance condition to facilitate a surge flow of fluid from a reservoir into a wellbore. The pressure reduction mechanism may include singularly or in combination a heat sink to reduce the temperature of the detonation gas, a reactant to recombine with the reactant gas and reduce the molar density of the detonation gas, and a physical compression mechanism to utilize the waste energy of the detonation gas to create work, simultaneously reducing the temperature of the gas and the molar density of the detonation gas.